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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/642,333	08/18/2003	Warren L. Johnson	1378-163	1947

7590 06/24/2005

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EXAMINER

HOPKINS, ROBERT A

ART UNIT	PAPER NUMBER
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1724

DATE MAILED: 06/24/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/642,333

Applicant(s)

JOHNSON ET AL.

Examiner

Robert A. Hopkins

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-23 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-16 and 18-22 is/are rejected.
- 7) ☒ Claim(s) 17 and 23 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>11-18-03</u> . | 6) <input type="checkbox"/> Other: ____. |

DETAILED ACTION

Specification

Examiner notes the term "BioOil" is capitalized and used in the specification and claims. Examiner is unsure as to if the term "BioOil" is associated with a trademark. Examiner notes trademarks are permitted in patent applications, however the generic chemical designation of the trademark should also be listed in the specification, because some trademark names have chemical structures that change over time, and examiner cannot locate a generic chemical designation for "BioOil" in the specification. Examiner requests clarification as to if "BioOil" is a trademark name or a well known term in the art. Examiner notes Himmelblau describes a "biomass pyrolysis oil". Examiner notes that if "BioOil" is the same as a "biomass pyrolysis oil", examiner respectfully submits applicant provide clarification in the current specification to exclude the term "BioOil" from being a trademark name.

Claim Objections

Claims 6 and 7 are objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. Claim 6 seems to provide a further structure limitation(a settling section), however step (b) in claim 1 seems to provide such a settling section with the step of "reducing gas velocity... to allow droplets in the gas stream to settle out". Examiner suggests rewording the

preamble of claim 6 to read --wherein the reducing gas velocity step includes providing a settling section...--. Claim 7 depends on claim 6 and hence is also objected to.

Claim Rejections - 35 USC § 112

Claims 1-12 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1 recites "reducing gas velocity to a temperature sufficiently low enough". Examiner is unsure as to how gas velocity can be reduced in temperature. Velocity and temperature are different variables, however gas velocity cannot be reduced in temperature. Examiner notes claim 13 which recites "a gas retention apparatus operative to reduce gas velocity with a temperature sufficiently low ...". Examiner believes that claim 1 should be reworded in the same form as claim 13, wherein a gas retention apparatus is at a desired temperature, and not a gas velocity at a desired temperature. Claims 2-12 depend on claim 1 and hence are also rejected.

Claim 5 line 4 recites "but about a freezing point". Examiner is unsure as to what is meant by "about a freezing point". Does applicant mean above a freezing point? Correction is requested.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

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(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-3,5-9,10,11,13-16,18-20,21,22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Underwood et al(5397582) taken together with Himmelblau(5115084).

Underwood et al teaches a method of continuously capturing BioOil and its constituents from a gas stream produced in a fast pyrolysis process(column 9 lines 32-38), in a usable liquid form so as to produce a non-condensable gas free of fouling contaminants comprising separating BioOil and its constituents from a gas stream using hot inertial separation(cyclones 48 and 54) to maintain the BioOil and its sticky and/or thick constituents at a temperature below its point of rapid degradation and above a point at which its viscosity is low enough to avoid inefficient operation of the separation equipment, and condensing vapor in the gas stream(condenser 60). Underwood is silent as to a step of reducing gas velocity with a temperature sufficiently low to allow droplets in the gas stream to settle out but high enough so that a viscosity of the droplets remains low enough to avoid inefficient operation of the separation equipment. Himmelblau teaches a method of continuously capturing BioOil and its constituents from a gas stream produced in a fast pyrolysis process(column 4 lines 3-5) in a usable liquid form so as to produce a non-condensable gas free of fouling contaminants comprising separating BioOil and its constituents from a gas stream using hot inertial separation(cyclones 212,214,215,218), and reducing gas velocity with a temperature sufficiently low(using coalescing vessel 220; column 5 lines 32-34) to allow droplets in

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the gas stream to settle out but high enough so that a viscosity of the droplets remains low enough to avoid inefficient operation of the separation equipment. It would have been obvious to someone of ordinary skill in the art at the time of the invention to provide a step of reducing gas velocity with a temperature sufficiently low to allow droplets in the gas stream to settle out but high enough so that a viscosity of the droplets remains low enough to avoid inefficient operation of the separation equipment so that additional oil droplets not separated by the cyclones of Underwood are removed before a further condensation step is employed.

Underwood et al further teaches collecting liquid from the gas stream produced by the pyrolysis method. Underwood et al further teaches wherein the step of separating BioOil includes providing a first cyclone separator(54) to collect liquid(to catchpot 56) in a range of 5 microns or greater. Underwood further teaches providing a BioOil, wax and char collection tank(56) coupled to a discharge outlet of the first cyclone separator operating in a temperature low enough to condense remaining free flowing liquids but about a freezing point of the liquids to increase retention time of the gas stream and slow down a rate of gas volume flow. Himmelblau further teaches a settling section(220) following a hot inertial separation section, wherein the settling section includes a gas tank. Underwood further teaches wherein the condensing step takes place in a condensing section whose temperature is in a range of 5-20 degrees C, and wherein the condensation section includes a gas cooler(60).

Underwood et al teaches all of the limitations of claims 10 and 21 but is silent as to a second cyclone separator coupled to an outlet of the gas cooler operative to collect

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condensate that has been reintrained in the gas stream in the gas cooler. Underwood teaches a mist eliminator(88) coupled to an outlet of a gas cooler(72), however examiner respectfully submits that cyclones are separation devices which are known for use in connection with condensation devices, therefore it would have been obvious to someone of ordinary skill in the art at the time of the invention to substitute a cyclone for the mist eliminator of Underwood et al to provide a more efficient separation of the condensate in the gas cooler of Underwood et al.

Claims 1-3,5-9,10,11,13-16,18-20,21,22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Freel et al(5792340) taken together with Himmelblau(5115084).

Freel et al teaches a method of continuously capturing BioOil and its constituents from a gas stream produced in a fast pyrolysis process(column 1 lines 13-18), in a usable liquid form so as to produce a non-condensable gas free of fouling contaminants comprising separating BioOil and its constituents from a gas stream using hot inertial separation(cyclones 2 and 6) to maintain the BioOil and its sticky and/or thick constituents at a temperature below its point of rapid degradation and above a point at which its viscosity is low enough to avoid inefficient operation of the separation equipment, and condensing vapor in the gas stream(condenser 8). Freel et al is silent as to a step of reducing gas velocity with a temperature sufficiently low to allow droplets in the gas stream to settle out but high enough so that a viscosity of the droplets remains low enough to avoid inefficient operation of the separation equipment.

Himmelblau teaches a method of continuously capturing BioOil and its constituents from

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a gas stream produced in a fast pyrolysis process(column 4 lines 3-5) in a usable liquid form so as to produce a non-condensable gas free of fouling contaminants comprising separating BioOil and its constituents from a gas stream using hot inertial separation(cyclones 212,214,215,218), and reducing gas velocity with a temperature sufficiently low(using coalescing vessel 220; column 5 lines 32-34) to allow droplets in the gas stream to settle out but high enough so that a viscosity of the droplets remains low enough to avoid inefficient operation of the separation equipment. It would have been obvious to someone of ordinary skill in the art at the time of the invention to provide a step of reducing gas velocity with a temperature sufficiently low to allow droplets in the gas stream to settle out but high enough so that a viscosity of the droplets remains low enough to avoid inefficient operation of the separation equipment so that additional oil droplets not separated by the cyclones of Freel et al are removed before a further condensation step is employed.

Freel et al further teaches collecting liquid from the gas stream produced by the pyrolysis method. Freel et al further teaches wherein the step of separating BioOil includes providing a first cyclone separator(6) to collect liquid(to catchpot 7) in a range of 5 microns or greater. Freel et al further teaches providing a BioOil, wax and char collection tank(7) coupled to a discharge outlet of the first cyclone separator operating in a temperature low enough to condense remaining free flowing liquids but about a freezing point of the liquids to increase retention time of the gas stream and slow down a rate of gas volume flow. Himmelblau further teaches a settling section(220) following a hot inertial separation section, wherein the settling section includes a gas tank. Freel

et al further teaches wherein the condensing step takes place in a condensing section whose temperature is in a range of 5-20 degrees C, and wherein the condensation section includes a gas cooler(60).

Freel et al teaches all of the limitations of claims 10 and 21 but is silent as to a second cyclone separator coupled to an outlet of the gas cooler operative to collect condensate that has been reintrained in the gas stream in the gas cooler. Freel et al teaches a mist eliminator(10) coupled to an outlet of a gas cooler(9), however examiner respectfully submits that cyclones are separation devices which are known for use in connection with condensation devices, therefore it would have been obvious to someone of ordinary skill in the art at the time of the invention to substitute a cyclone for the mist eliminator of Freel et al to provide a more efficient separation of the condensate in the gas cooler of Freel et al.

Allowable Subject Matter

Claims 4,12,17,23 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claim 4 recites "wherein the step of separating BioOil includes providing a meandering pipe following the first cyclone separator to collect liquid having a sub-micron particle range and greater". Underwood et al, Freel et al, and Himmelblau teach a series of cyclones , but fail to teach a meandering pipe following the first cyclone

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separator to collect liquid having a sub-micron particle range and greater. It would not have been obvious to someone of ordinary skill in the art at the time of the invention to provide a meandering pipe following the first cyclone separator to collect liquid having a sub-micron particle range and greater because neither Underwood et al nor Freel et al nor Himmelblau suggest such a modification.

Claim 17 recites, wherein said separator further includes a meandering pipe coupled to an outlet of said inertial separator operative to collect BioOil droplets, wax, resin, char, and aerosol in a sub-micron size and greater". Underwood et al, Freel et al, and Himmelblau teach a series of cyclones , but fail to teach a meandering pipe following the first cyclone separator to collect liquid having a sub-micron particle range and greater. It would not have been obvious to someone of ordinary skill in the art at the time of the invention to provide a meandering pipe coupled to an outlet of said inertial separator operative to collect BioOil droplets, wax, resin, char, and aerosol in a sub-micron size and greater because neither Underwood et al nor Freel et al nor Himmelblau suggest such a modification.

Claims 12 and 23 recite "including return lines coupled to outlets of said first cyclone collection tank, said gas tank and said condensate collection tank operative to return collected liquid to the gas stream prior to the separation step". Neither Underwood et al nor Freel et al teach including return lines coupled to outlets of said first cyclone collection tank, said gas tank and said condensate collection tank operative to return collected liquid to the gas stream prior to the separation step. It would not have been obvious to someone of ordinary skill in the art at the time of the invention to

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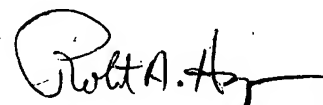
provide return lines coupled to outlets of said first cyclone collection tank, said gas tank and said condensate collection tank operative to return collected liquid to the gas stream prior to the separation step because neither Underwood et al nor Freel et al suggest such a modification.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Robert A. Hopkins whose telephone number is 571-272-1159. The examiner can normally be reached on Monday-Friday, 7am-4pm, alternate Fridays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Duane Smith can be reached on 571-272-1166. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Rah
June 22, 2005


ROBERT A. HOPKINS
PRIMARY EXAMINER
A.U. 1724